

I claim:

1. A bumper system for a vehicle comprising:
a beam adapted for attachment to a vehicle;
an energy absorber engaging a face of the beam; the energy absorber having a top horizontal section defined by a top wall and an upper-mid wall connected by an upper-front wall, and having a bottom horizontal section defined by a bottom wall and a lower-mid wall connected by a lower-front wall, and further having a middle horizontal section defined by a mid-front wall connecting the upper-mid wall and the lower-mid wall, the top and bottom horizontal sections including top and bottom front nose portions that extend forward of the mid-front wall and that define a horizontal channel therebetween in front of the mid-front wall;
the front nose portions being configured to provide a first level of energy absorption during an initial impact stroke that collapses one or both of the front nose portions, and the top, middle, and bottom horizontal sections providing a higher second level of energy absorption during a continuing impact stroke that collapses the energy absorber against the face of the beam; and
a fascia covering the energy absorber and the beam;
whereby, during an initial front impact stroke, the top and bottom front nose portions provide a relatively low-energy absorption that "catches" an impacted object such as a knee of a human being, and then during a further continuing impact stroke, the top, middle, and bottom horizontal sections crush to provide an increased energy absorption.
2. The bumper system defined in claim 1, wherein the top and bottom walls define wavy and undulating surfaces.
3. The bumper system defined in claim 1, wherein the beam comprises an open channel having a height-to-depth ratio of at least 3:1.
4. The bumper system defined in claim 1, wherein the beam is rollformed.

5. The bumper system defined in claim 1, wherein the beam face defines a longitudinal forwardly-facing recess, and wherein the energy absorber includes a rearwardly-extending protruding ridge that extends into the forwardly-facing recess.
6. The bumper system defined in claim 5, wherein the middle horizontal section of the energy absorber includes the rearwardly-extending protruding ridge.
7. The bumper system defined in claim 1, wherein the top and bottom nose portions are semi-rigid but collapsible with a parallelogram motion that shifts one or both of the top and bottom front walls vertically, such that horizontal impact forces are converted at least in part to a vertical force upon receiving a horizontal frontal impact.
8. The bumper system defined in claim 7, wherein the top nose portion collapses with a parallelogram motion that shifts the upper-front wall upward during an impact.
9. A bumper system for a vehicle comprising:
 - a beam adapted for attachment to a vehicle and having a longitudinal curvature that, when viewed from above in a vehicle-mounted position, is shaped to match an aerodynamic curvilinear shape of a front of the vehicle;
 - an energy absorber engaging a face of the beam; the energy absorber having a top horizontal section defined by a top wall and an upper-mid wall connected by an upper-front wall, and having a bottom horizontal section defined by a bottom wall and a lower-mid wall connected by a lower-front wall, the top and bottom horizontal sections including top and bottom front nose portions that extend forwardly;
 - the top and bottom nose portions each being semi-rigid but collapsible with a parallelogram motion that shifts one or both of the top and bottom front walls vertically, such that horizontal impact forces are converted at least in part to a vertical force upon receiving a horizontal frontal impact during an initial stroke of the frontal impact; and
 - whereby, during a first part of the frontal impact, the top and bottom front nose portions provide a relatively low-energy absorption that “catches” an impacted object such as a knee of a

human being, and then during a further continuing impact stroke, the top and bottom horizontal sections crush to provide an increased energy absorption.

10. The bumper system defined in claim 9, wherein the top and bottom walls are wavy.
11. The bumper system defined in claim 9, wherein the beam comprises an open channel having a height-to-depth ratio of at least 3:1.
12. The bumper system defined in claim 9, wherein the beam is rollformed.
13. The bumper system defined in claim 9, wherein the beam face includes a longitudinal forwardly-facing recess, and the energy absorber includes a rearwardly-extending protruding ridge that extends into the forwardly-facing recess.
14. The bumper system defined in claim 13, wherein the mid-horizontal section of the energy absorber includes the rearwardly-extending protruding ridge.
15. A method comprising steps of:
 - constructing a bumper system including a stiff beam, and an energy absorber on a face of the beam, the energy absorber having top, middle, and bottom sections, with the top and bottom sections defining nose portions that extend forward of the middle section, the nose sections defining a space therebetween in front of the middle section, the top and bottom nose sections being constructed to deflect with a parallelogram motion upon impact; and
 - shifting at least one of the nose portions vertically with a parallelogram motion in response to an impact directed horizontally against a front of the bumper system, whereby energy directed against a knee of an impacted person is converted into a throwing force that directs the person in a direction generally perpendicular to the line of impact and away from the vehicle bumper system.